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Installation and Setup Guide

EMC DATA DOMAIN DD990 WITH DD EXTENDED RETENTION

761-0616-0003

Installation and Setup Steps

The steps for a complete installation and configuration are:

1. Install hardware
2. Define the Data Domain system information for your site
3. Perform initial system configuration
4. Configure the system for data access
5. Configure optional software
6. Perform optional additional system configuration

1 Install Hardware

1. **Unpack the Data Domain system.** A system consists of an EMC Data Domain DD990 controller with DD Extended Retention software and up to 1680 TB of raw storage in optional expansion shelves.
   - Open the "Open Me First" box, then open the remaining boxes for the controller and expansion shelves.
   - Remove the accessories and rack mount kits for all system components.
2. **Install the appropriate rack mounting hardware** for the controller and expansion shelves into one or more 19-inch, four-post racks. Ensure that the rack is securely anchored to prevent tipping. Load the rack or cabinet beginning at the bottom to prevent the rack from becoming top-heavy. Be sure to plan appropriate vertical space to accommodate the 4U controller and 3U for each expansion shelf.
   - See the instructions included with the controller and shelf rails.
3. **Install the controller and expansion shelves in the rack.**
   - Remove the controller and expansion shelves from the shipping boxes.
   - Install each component horizontally on the corresponding rails and slide into the rack in the order described in the *ES30 Expansion Shelf Hardware Guide*. Be sure one person is at each side of each component for proper and safe installation.
   - Secure the components in the rack; see respective hardware manual.
4. **Connect expansion shelves to the controller.** Connect the controller's SAS ports to the expansion shelves based on the cabling diagrams for expansion shelf connectivity. See Figure 4. Use the Cable Management Bar and Velcro strips to support and organize all cables.
5. **Connect an administrative console.** Attach a serial console to the controller's serial port; or use KVM connections to connect monitor (VGA port), keyboard and mouse. See Figure 1.
6. **Enable data transfer connectivity.** Repeat for each connection.
   - **Ethernet connection:** If using 1 Gb copper Ethernet, attach a Cat 5e or Cat 6 copper Ethernet cable to an RJ45 Ethernet network port (start with eth0a and go up) on the controller, and attach the other end to an Ethernet switch or to an Ethernet port on your server. If using 1 Gb fiber Ethernet, use multimode fiber cables with LC connectors. If using 10 Gb copper Ethernet with an SFP+ connector, use a qualified SFP+ copper cable. If using 10 Gb fiber Ethernet, use MMF-850nm cables with LC duplex connectors. See Figure 1.
7. **Provide redundant power to the system.**
   - **Controller power:** Connect power cables to the four receptacles. Ensure that each pair of power supplies is connected to a different power source.
   - **Expansion shelf power:** Connect power cables to both receptacles and attach the power cable retention clips. Each shelf power cable should connect to a different power source. See Figure 3.
8. **Turn the system on.** Power on any expansion shelves before the controller.
   - **ES30 power:** The ES30 powers on when plugged in. Wait approximately 3 minutes after all expansion shelves are turned on.
   - **Controller power:** Push the power button. See Figure 2.
   - Attach the bezels.
9. **Collect the information needed for installation.** Record the information in Section 2 of this document.

Safety

All plug-in modules and blank plates are part of the fire enclosure and must be removed only when a replacement can be added immediately. The system must not be run without all parts in place.

- A controller or a shelf must be operated only from a power supply input voltage range of 100–240 VAC, 50–60 Hz.
- Each component is intended to operate with all working power supplies installed.
- Provide a suitable power source with electrical overload protection.
- A safe electrical earth connection must be provided to the power cord. Check the grounding of the power sources before applying power.
- The plug on each power supply cord is used as the main disconnect device. Ensure that the socket outlets are located near the equipment and are easily accessible.
- Permanently unplug the unit if you think it is damaged in any way and before moving it. If the unit is powered by multiple sources, disconnect all supplied power for complete isolation.
- The power connections must always be disconnected prior to removal or replacement of a power supply module from any of the components in the system.
- A faulty power supply module must be replaced within 24 hours.
- Do not lift system components by yourself. A controller weighs up to 110 lbs (50.0 kg) and an expansion shelf weighs up to 78 lbs (35.5 kg).
- Do not lift an expansion shelf by the handles on any modules. The handles are not designed to support the weight of the populated shelf.
- To comply with applicable safety, emission, and thermal requirements, covers must not be removed and all bays must be fitted with plug-in modules.
- Load the rack beginning at the bottom to prevent the rack from becoming top-heavy.
- Do not extend components on slide rails until you have loaded at least three or more similarly weighted items in the rack, or unless the rack is bolted to the floor or overhead structure to prevent tipping.

Caution: If the system is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Caution: The RJ45 sockets on the motherboard/PCI cards are for Ethernet connection only and must not be connected to a telecommunications network.

ESD PRECAUTIONS

Data Domain recommends that you fit and check a suitable antistatic wrist or ankle strap and observe all conventional ESD precautions when handling plug-in modules and components.

EMC Data Domain DD990 with DD Extended Retention

FIGURE 1: REAR PANEL AND INPUT/OUTPUT CONNECTIVITY

Slot 11 PCI (x8)	Slot 10 PCI (x8)	Slot 9 PCI (x8)	Slot 8 PCI (x4)	Slot 7 PCI (x4)	Slot 6 PCI (x16)	Slot 5 PCI (x8)	Slot 4 PCI (x8)	Slot 3 PCI (x4)	Slot 2 PCI (x4)	Slot 1 PCI (x4)
NIC or VTL	NIC or VTL	SAS	SAS	NVRAM	NIC or VTL	SAS	SAS	NVRAM	NIC (1G only)	SAS (internal only)

NOTE: For SAS PCI cards, port "a" is on the bottom. For other optional PCI cards, port "a" is on the top.

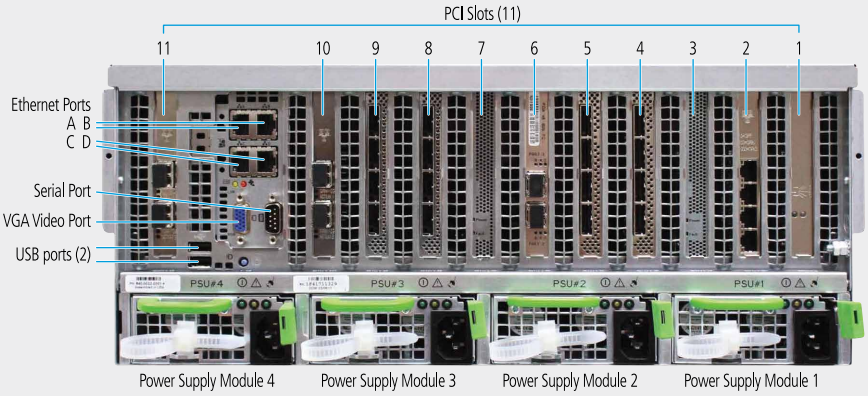
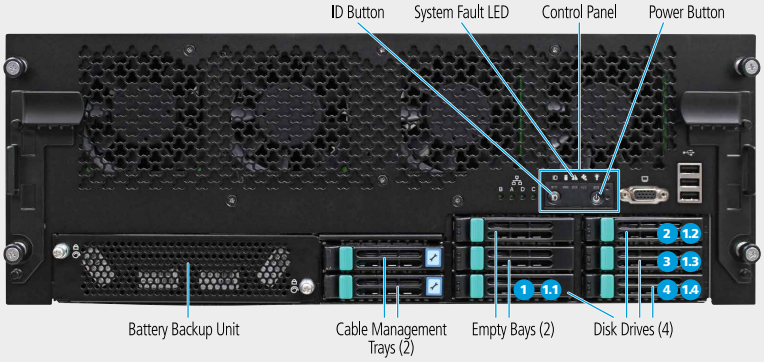


FIGURE 2: FRONT PANEL AND DISK LOCATIONS

Blue circles illustrate the locations of the hot-swap disks.

Hot-swappable disks

Physical location: 1 2 3 4
Logical numbering: 1.1 1.2 1.3 1.4



System Fault LED

Display	Meaning
Steady Green	Normal operation
Blinking Green	Startup
Steady Amber	Critical fault. Shut down system for service.
Blinking Amber	Non-fatal fault. Investigate; service the system.

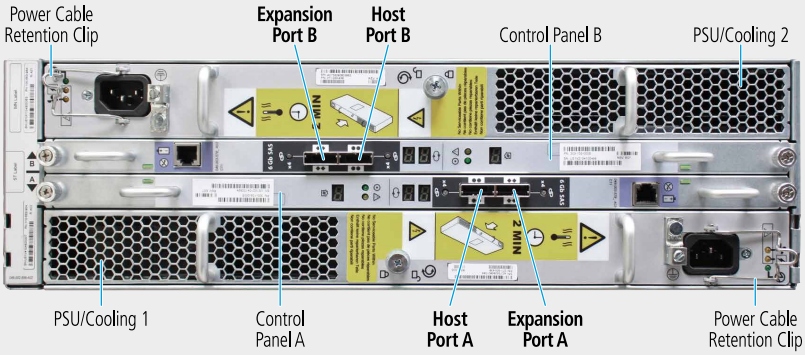
Front Operator Panel Buttons

Push Button	Definition
Power	Press to start boot (if system is not running). Never shut down the system by pressing the power button. The button glows steady green in the normal operating state.
Enclosure ID	Press the ID switch to light the blue ID LEDs on the front and back panels.

Data Domain Expansion Shelves

FIGURE 3: ES30 EXPANSION SHELF

Expansion shelf disk-drive numbering and components:



Connecting Multiple Expansion Shelves

EXPANSION SHELF CABLING

The system supports any combination of 15 and 30 TB ES30 shelves up to a maximum of 56 shelves or 1680 TB of raw storage. Multiple expansion shelves are connected together and to the controller with qualified SAS cables. Save extra SAS cables for future shelf expansion.

ES30 Expansion Shelves

- Use a SAS cable with mini-SAS connectors for any ES30 SAS connection. These are keyed and marked. For the Host HBA, use the ♦ end.
- Cables should be dressed to the side of the rack and supported with velcro straps to allow for easy removal of a controller or power supply.
- In the DD990 the strings are not contiguous. The order of shelf addition is designed for easy expansion from a standard DD990 system and to (nearly) fill a rack before adding the next rack. The gaps in the racks are positioned to create a standard expansion rack that is just re-cabled based on its rack number position.

HOT ADDITION OF EXPANSION SHELVES

Add shelves following the instructions in the Install Hardware section. The ES30 uses the markings ● to indicate a HOST port and ♦ to indicate an EXP'N port. Cabling between adjacent shelves in a string is done with the 1M SAS cables that are delivered with the shelves. Cable from the B Controller EXPANSION ♦ port of lower shelf to the B controller HOST ● port of the next higher shelf in the string. Then cable from the A Controller HOST ● port of lower shelf to the A controller EXPANSION ♦ port of the next higher shelf.

When adding shelves to an existing string, move the cable from the B controller HOST ● port to the new shelf. Then add the shelf-to-shelf 1M cables. 5M cables are used to provide the maximum flexibility. Loop any excess and use the Velcro straps to attach to a convenient place in the rack. The first 24 shelves that are added are the first 4 shelves in strings V1-V6. The third rack adds shelves 5 to 7 of strings V1, V4, V6, and V5, in that order (V1.5, V1.6, V1.7, V4.5, V4.6, and so on). Instead of using 1M cables for the shelf-to-shelf connections between shelves 4 and 5 of these strings, 5M cables are necessary.

CABLING INSTRUCTIONS

String	HBA port	Shelf port	Length
1	9A	B controller HOST ● port of shelf V1.1	2M
1	5B	A controller HOST ● port of the highest number shelf in V1	2M/3M
2	8B	B controller HOST ● port of shelf V2.1	2M
2	5A	A controller HOST ● port of the highest number shelf in V2	2M/5M
3	9B	B controller HOST ● port of shelf V3.1	2M
3	4A	A controller HOST ● port of the highest number shelf in V3	2M/5M
4	5D	B controller HOST ● port of shelf V4.1	3M
4	9C	A controller HOST ● port of the highest number shelf in V4	3M/5M
5	5C	B controller HOST ● port of shelf V5.1	3M
5	8C	A controller HOST ● port of the highest number shelf in V5	3M/5M
6	9D	B controller HOST ● port of shelf V6.1	3M
6	4D	A controller HOST ● port of the highest number shelf in V6	3M/5M
7	8A	B controller HOST ● port of shelf V7.1	2M
7	4B	A controller HOST ● port of the highest number shelf in V7	5M
8	4C	B controller HOST ● port of shelf V8.1	5M
8	8D	A controller HOST ● port of the highest number shelf in V8	5M

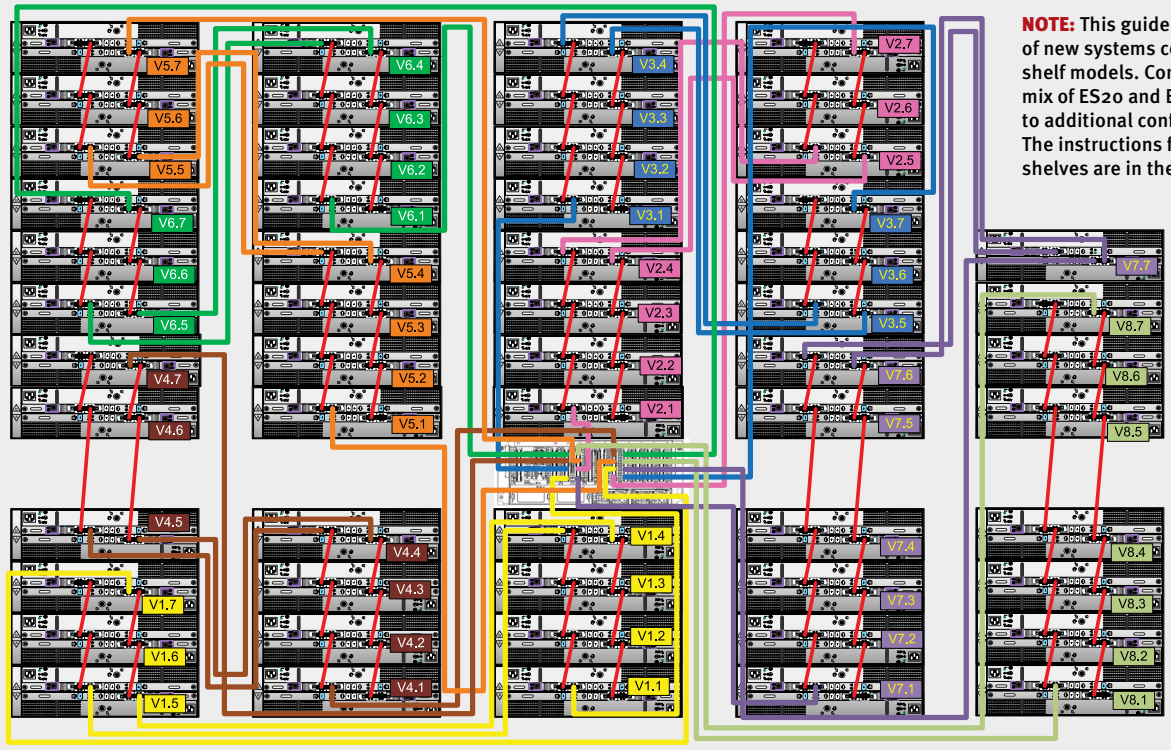
The fourth rack first adds the seven 7 shelves of string V7 and then shelves 5-7 of strings V3 and V2, in order. The fifth rack only has the 7 shelves of string V8.

Power-Up and Final Configuration

- Power on the expansion shelf or shelves using the instructions in the *Install Hardware* section.
- Use the `storage add enclosure` when ready to put the enclosure into use and expand the capacity of the system. The enclosure-id is always 2 for the first added shelf, and 3 for the second. The Data Domain controller always has the enclosure-id of 1 (one).

  `storage add tier active|archive enclosure` *`enclosure-id`*

FIGURE 4: RECOMMENDED ES30 CABLING DIAGRAM (matches factory configuration)



NOTE: This guide describes the installation of new systems comprised of all-ES30 shelf models. Configurations including a mix of ES20 and ES30 shelves are subject to additional configuration constraints. The instructions for mixing ES30 and ES20 shelves are in the *ES30 Hardware Guide*.

NOTE: In Figure 4 the shelves are labeled VN.M. VN refers to string "N" and the "M" is the number of the shelf in the string. For example, V3.2 refers to the second shelf in the third string. The cabling and racking are designed so that shelves are added from the bottom up in a rack.

2 Define the Data Domain System Information for Your Site

SYSTEM SETUP WORKSHEET

An installation requires information unique to your site. Before starting the installation, provide values for the system information listed below.

1. A fully qualified host name for the system: _____

2. The DNS domain name: _____

3. Use Table 1 (below) to enter Ethernet connectivity information.

4. A default gateway IP address (if no DHCP): _____

5. DNS server IP addresses (if no DHCP) (fill in below):

Primary	Secondary	Tertiary

6. Select the CIFS authentication method:

Workgroup ❑ **Active Directory** ❑

Workgroup name: _____ Realm name: _____

Backup user name: _____ Domain admin name: _____

Password: _____ Password: _____

7. Host name from which to administer the system:

_____

8. Administrator's email address (or admin group alias):

_____

9. (Optional) Description of the system's physical location:

10. Mail server (SMTP) host name: _____

11. Time zone name (default is US/Pacific): _____

12. System Controller ID from the License Code document provided in the accessory kit. Use this ID to obtain the unique WWPN for this controller using the WWPN tool at https://my.datadomain.com/us/en/wwpn.jsp

_____

13. Record the serial number (SN) found on the back of the chassis.

_____

TABLE 1:

Ethernet Connectivity	eth0a	eth0b	eth4a	eth4b	eth4c	eth4d	eth5a	eth5b	eth5c	eth5d
Enable	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑
Use DHCP*	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑
IP address (if no DHCP)										
Netmask (if no DHCP)										

***** DHCP is not recommended for production systems

3 Perform Initial System Configuration

NOTE: Refer to the NVRAM Battery Charging Instructions for information on battery charge time at initial system installation.

Log into the system with the user name of sysadmin. The password is the system's serial number. At the first login, the CLI configuration utility starts.

- You will be prompted to enter the Name, and Domain Name of the system
- You will next be prompted to configure the initial IP port. You can choose DHCP or enter a static IP address and Net Mask.
- You will then be asked to either exit the configuration utility and continue configuring the system using the Graphical User Interface, or to continue using the CLI configuration utility

Both the CLI configuration utility and GUI configuration wizard contain six sections: Licenses, Network, File System, System, CIFS, and NFS. The GUI also includes a section to configure VTL.

USING THE CLI CONFIGURATION UTILITY

The list entries in the utility can be comma-separated, space-separated, or both.

- At each prompt, enter a value, OR
- Enter a question mark (?) for more details, OR
- Press Enter to accept the value displayed in braces.

Follow the configuration utility instructions for entering appropriate values. At the end of each configuration section, you can choose to: Save, Cancel, or Retry (restart the input entry as the beginning of the current section).

4 Configure the System for Data Access

The Data Domain system provides multiple protocols for data access: NFS,CIFS, VTL, and DD Boost. You need to configure one or more protocols for data access, depending on your environment. You also need to configure the clients for accessing the Data Domain system with the protocol of your choice.

NFS

The NFS configuration section in the configuration utility sets up the NFS clients to allow access to `/backup` on the Data Domain system. You also need to set up the NFS clients to allow access to `/backup` on the Data Domain system. This can be done using the following steps:

- Create a mount point (directory) such as `/dd/rstr01/backup` and create an administrative mount point such as `/dd/rstr01/ddvar`.
- NFS mount the directories on the new mount points. For example:
  ```
  mount -F nfs -o hard,intr,vers=3,proto=tcp rstr01:/backup /dd/rstr01/backup
  mount -F nfs -o hard,intr,vers=3,proto=tcp rstr01:/ddvar /dd/rstr01/ddvar
  ```
- Add the following lines to the file `/etc/vfstab` (the file name may be different depending on your UNIX-based system). The lines mount the directories at every reboot. For example:
  ```
  system:/backup - /dd/rstr01/backup nfs - yes hard,intr,vers=3,proto=tcp
  system:/ddvar - /dd/rstr01/ddvar nfs - yes hard,intr,vers=3,proto=tcp
  ```
- To cause backup software to abort when the system is not mounted, create a backup directory within the mounted file system, such as `/dd/rstr01/backup/disk1`.
- For more configuration information, see the specific Data Domain Integration Documentation at https://my.datadomain.com/US/en/integration.jsp.

CIFS

The CIFS configuration section in the configuration utility sets up the CIFS clients to allow access to `/backup` on the Data Domain system. You also need to set up the CIFS clients to allow access to `/backup` on the Data Domain system. For additional configuration information, see the specific Data Domain Integration Documentation at https://my.datadomain.com/US/en/integration.jsp.

DD BOOST FOR OPENSTORAGE (OPTIONAL LICENSE REQUIRED)

For setting up the Data Domain DD Boost feature, see the *Data Domain Boost for OpenStorage Administration Guide* available at https://my.datadomain.com/US/en/platform.jsp.

APPLICATION INTEGRATION

For information about how to integrate the Data Domain system with backup software, see the documentation for the applicable application at the Data Domain Integration Documentation section on the Data Domain Support web site https://my.datadomain.com/US/en/integration.jsp.

5 Configure Optional Software

If you purchased optional software for the Data Domain system such as Replicator or Retention Lock, the licenses are enabled on your Data Domain system prior to shipment. You need to configure them for use. Details on configuring the optional software can be found in the *DD OS Administration Guide*. Access the latest documents at https://my.datadomain.com/US/en/platform.jsp.

6 Perform Optional Additional System Configuration

ADDITIONAL SYSTEM CONFIGURATION

Any system command that accepts a list, such as a list of IP addresses, accepts entries separated by either commas or spaces. See the *DD OS Commmand Reference Guide* for command details.

Give access to additional backup servers:

```
# nfs add /backup {*|client-list}
[options]
```

Add users to the email list that reports system problems:

```
# alerts notify-list add group-name
```

Add users to the system report email list:

```
# autosupport add {alert-summary|asup-detailed}
emails email-list
```

Enable FTP or TELNET:

```
# adminaccess enable {ftp|telnet}
```

Add remote hosts to use FTP or TELNET:

```
# adminaccess add {ftp|telnet}
fqdn-host-list
```

Add a user:

```
# user add name [role {admin|user}]
```

Change a user's password:

```
# user change password username
```

Enable remote management:

Refer to the *Administration Guide* for details

TO SHUT DOWN THE SYSTEM

Important: Never shut down the system by pressing the power button. Instead, use:

```
# system poweroff
```

Troubleshooting Tips

For troubleshooting information see the Data Domain Support web site https://my.datadomain.com.

Where to Go for More Information

For information about	Go to https://my.datadomain.com/US/en/documentation.jsp for
How to configure the system	*Initial Configuration Guide*
New features, enhancements, known issues, and late-breaking news	*Release Notes* for your software release
How to manage the Data Domain operating system	*DD OS Administration Guide* for your software release
How to install and use the DD Boost software and plug-in	*DD Boost for OpenStorage Administration Guide* for your platform
How to replace Data Domain hardware components	Part Installation Guides
How to use third-party applications	Integration Documentation and Compatibility Matrices
How to configure mixed ES20 and ES30 systems	*ES30 Hardware Guide*

Specifications

Model	System Heat Output Watts	System Heat Output BTU/hr	Power (VA) 100-120 / 200-240 V~	Weight lb / kg	Rack Mounted Dimensions WxDxH in (cm)		
DD990 with DD Extended Retention SW	1400	6924	1400	110 / 50.0	16.7 (42.4)	27.7 (70.4)	6.8 (17.4)
ES30	235	800	280	68 / 30.8	19 (48.3)	14 (35.5)	5.25 (13.3)

Operating Temperature	50° to 95° F (10° to 35° C), derate 1.1° C per 1000 feet, above 7500 feet up to 10,000 feet
Operating Humidity	20% to 80%, non-condensing
Non-operating Temperature	-40° to +149° F (-40° to +65° C)
Operating Acoustic Noise	DD990: Sound power, L_{WAd}: 7.52 bels. Sound pressure, L_{pAm}: 56.4 dB. (Declared noise emission per ISO 9296.) Expansion Shelves: Sound power, L_{WAd}: 6.5 bels, Sound pressure, L_{pAm}: 48.5 dB. (Declared noise emission per ISO 9296.)

Site Requirements

Requirement	Description and Specification
Vertical Space in Standard 19", Four Post Rack	DD990 with DD Extended Retention Software: 4U. Expansion Shelf: 3U. Do not use a two-post rack. See the included slide rail and installation documentation instructions for installing in a rack.
Air Conditioning	Use air conditioning that can cope with the maximum BTU/hr thermal rating.
Temperature Controls	Use adequate temperature control with a gradient (change) not to exceed 30° C in an hour.
Ventilation and Airflow	In a closed or multi-unit rack, ensure that the unit has adequate airflow through the front bezel and back panel and that the ambient air temperature requirements are met. Ensure that the front bezel and back panel clearances are met. Ensure that cables at rear of unit do not obstruct exhaust airflow. If installing in a closed cabinet, ensure that the front and rear doors have at least 65% open area to ensure adequate airflow for cooling.
Front Bezel Clearance	1.56 inches (4.0 cm) of unobstructed clearance.
Back Panel Clearance	5 inches (12.7 cm) of unobstructed clearance.
Power / Grounding	Each AC power outlet contains an earth ground conductor (safety ground). A safe electrical earth connection must be provided to each power cord. **Voltage:** 100-120 V~ or 200-240 V~. **Frequency:** 50 to 60 Hz.

Contact Information

TECHNICAL CONTACTS

To resolve issues with Data Domain products, contact your contracted support provider or visit us online at https://my.datadomain.com.

CORPORATE CONTACTS

2421 Mission College Blvd.
Santa Clara, CA 95054

866.WE.DDUPE (866.933.3873) or 408.980.4800

sales@datadomain.com

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